



Colorado Department  
of Public Health  
and Environment

# Introduction

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Lillian Gonzalez

[lillian.gonzalez@state.co.us](mailto:lillian.gonzalez@state.co.us)

303.692.3351



# Pharmaceuticals in the Environment



- USGS finds pharmaceuticals, hormones and other organic pollutants in 139 streams in 30 states in 1999/2000\*.
- Health care facilities are one source of pharmaceutical waste.

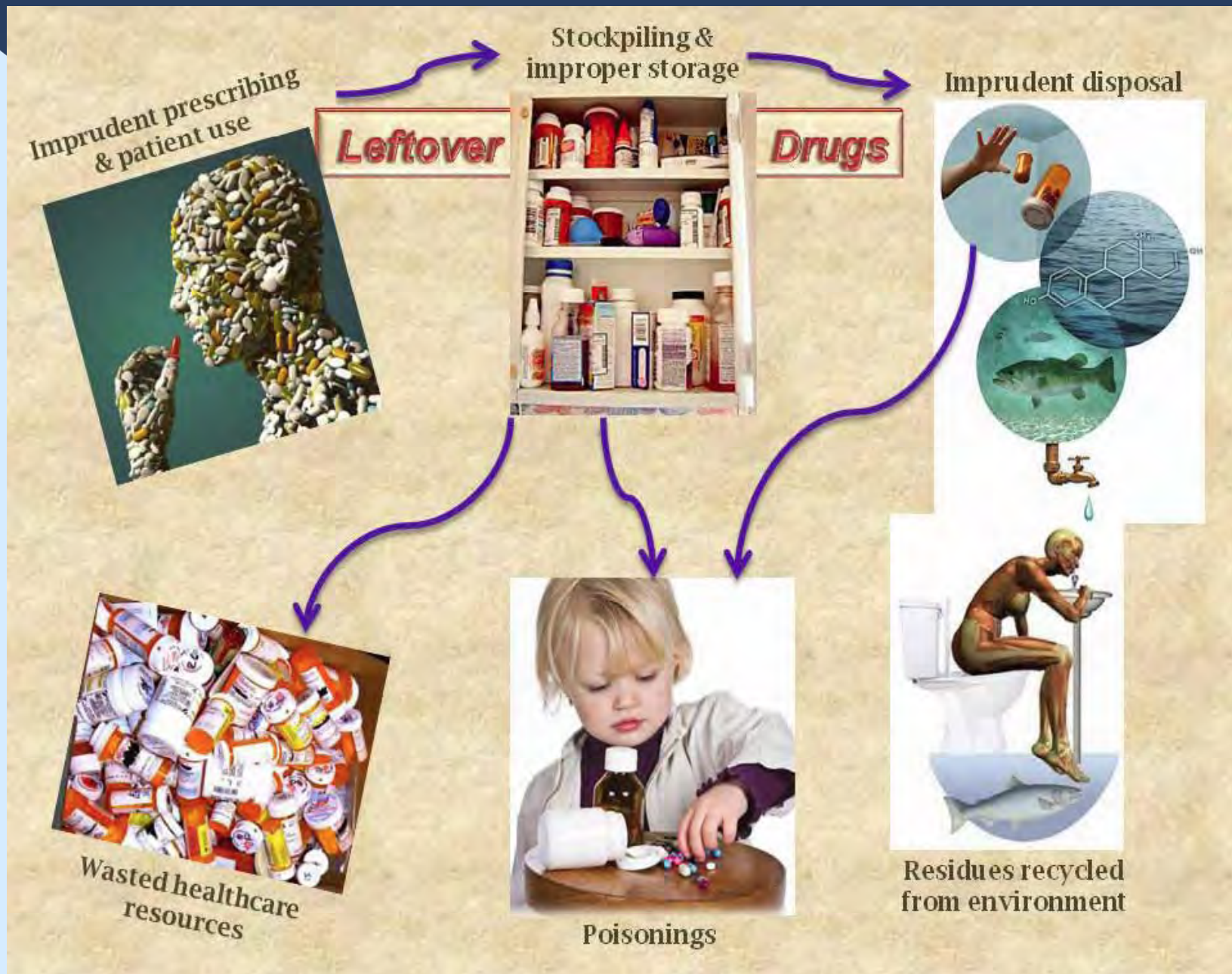
\*Source: USGS Open-File Report 02-94.

# Endocrine Disrupting Chemicals Downstream of Urban Areas

- Up to 21% males downstream of wastewater treatment plant; up to 46% males upstream.
- Up to 22% intersex fish downstream; none upstream.
- A variety of endocrine active chemicals, including synthetic estrogen found in effluent.

Source: Alan M Vajda, Larry B. Barber, James L. Gray, Elena M. Lopez, John D. Woodling, and David O. Norris. *Reproductive Disruption in Fish Downstream from Estrogenic Wastewater Effluent*. Environ. Sci. Technol. 2008, 42, 3407-3414.





Source: Daughton CG "Drugs and the Environment: Stewardship & Sustainability," National Exposure Research Laboratory, Environmental Sciences Division, US EPA, Las Vegas, Nevada, report NERL-LV-ESD 10/081, EPA/600/R-10/106, 12 September 2010, 196 pp: available: <http://www.epa.gov/nerlesd1/bios/daughton/APM200-2010.pdf>

# Why pharmaceuticals may need to be disposed

- Expiration;
- Patient Refusal;
- Dispensing Errors;
- Change in Physicians' Orders;
- Over Prescribing;
- Patient Death.



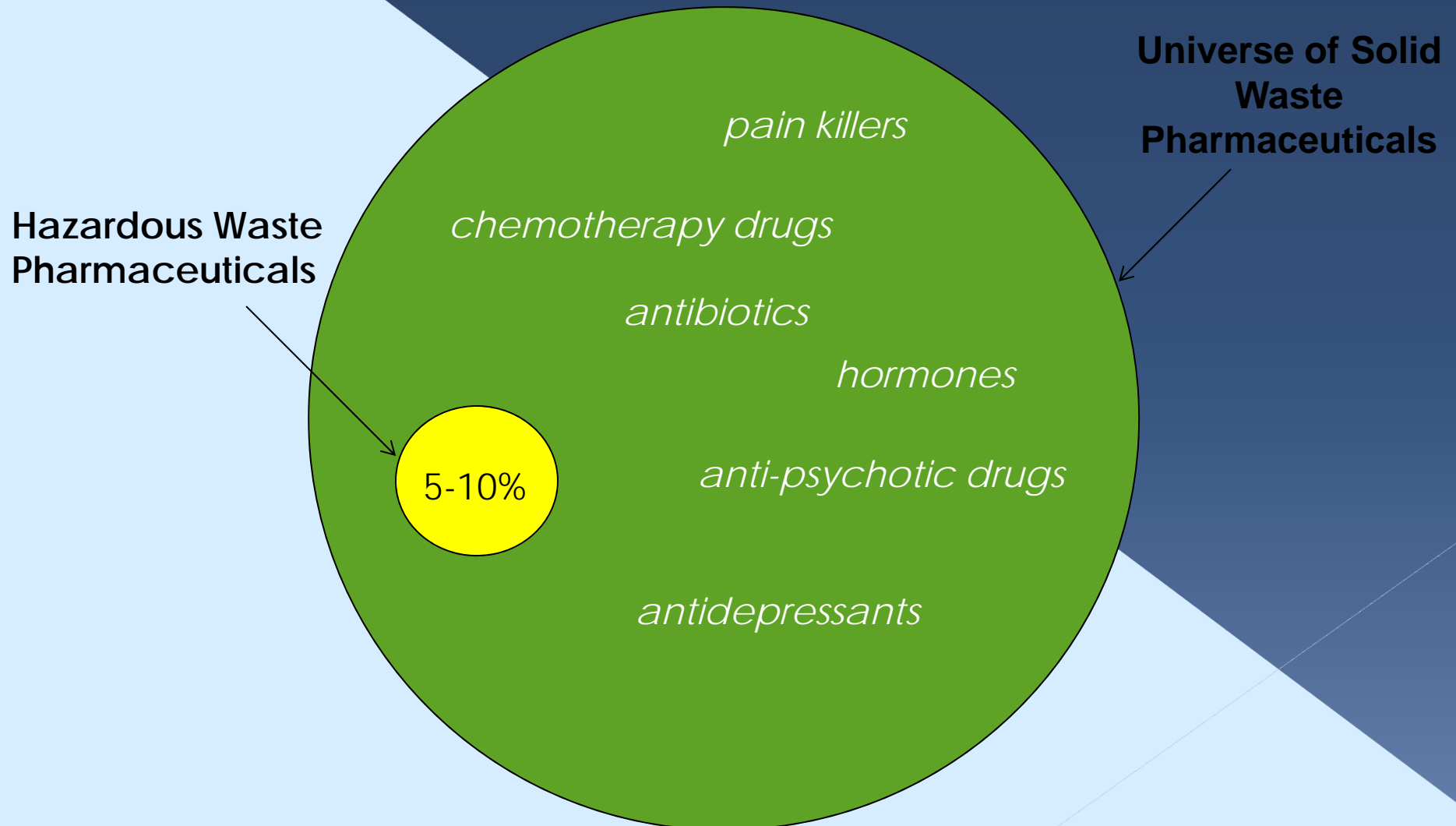
# Waste Requirements and Health Care Facilities

- Hazardous waste and solid waste rules fully apply to health care facilities.
- Hazardous waste penalty maximum is \$25,000/day per violation.
- Proper disposal helps manage risk to hospital, employees, contractors, and environment.





# <5-10% of Pharmaceutical Waste is RCRA Hazardous Waste



# Some RCRA Hazardous pharmaceuticals...

Exceeds  
TCLP for Ag



Ignitable Hazardous  
Waste (flashpoint < 140  
degrees F.)



Exceeds  
TCLP for m-  
cresol

Acutely  
hazardous  
P listed  
wastes



Photo © 2008 Erowid.org



# Where Can Pharmaceutical Waste Legally Go in Colorado?

(uncontrolled substances only)

Non-Hazardous Waste (6 CCR 1007-2, Section 13.9.3)	Hazardous Waste (6CCR 1007-3)
•Send to reverse distributor	•Disposal at permitted hazardous waste treatment, storage or disposal facility
•Mail-back service for proper disposal	
•Stabilization at approved facility followed by disposal at SW disposal site	
•Incinerator approved for the waste (currently none in Colorado)	
•SW facility approved (currently none in Colorado)	
•For chemotherapy drugs, incineration at specifically approved facility (currently none in Colorado)	

In most cases, the worst disposal option for waste meds\*...



\*May be necessary for controlled substances

# Common Hazardous Waste Violation for Health Care Facilities





# What Happens to Sharps Containers?

- Step 1:  
Contents are autoclaved compacted.



# What Happens to Sharps Containers?

- Step 2: Autoclaved and compacted waste goes to municipal landfill.
- Step 3: Wastewater is discharged to local sanitary sewer.
- Step 4: Wastewater treatment sludge goes to municipal landfill.





# Other Health Care Wastes...

Waste Lab Solvents



Waste Lab Reagents



Sharps and Infectious Waste



Mercury-containing Lighting Waste



Used Electronics



# Disposal Scenarios



- Tissue
- Pharmaceuticals
- Chemo (trace and bulk)
- Hazardous Waste (if RCRA incinerator)

**Hospital Waste**

- “Red bag” waste or sharps
- NO recognizable body parts
- NO Pharmaceuticals
- NO radioactive waste
- NO chemo waste

# CDPHE: Working with Front Range Hospitals

- CDPHE began stakeholder meetings & compliance assistance inspections at Front Range hospitals in 2008.
- CDPHE began regular inspections at Front Range hospitals in 2009.



# Current: Focus on Rural Hospitals

- Generator Assistance Program (GAP) inspections at rural hospitals in through end of 2012.
- 2011/12: Formal Health care waste management training sessions and other outreach
- Regular inspections for rural hospitals planned to begin in 2013.





# 2013 and Beyond



- Long term care
- Veterinary healthcare
- Other health care facilities

